

(12) **UK Patent Application** (19) **GB** (11) **2 349 292** (13) **A**

(43) Date of A Publication 25.10.2000

(21) Application No 0009472.2

(22) Date of Filing 17.04.2000

(30) Priority Data

(31) 11116868

(32) 23.04.1999

(33) JP

(71) Applicant(s)

**Matsushita Electric Industrial Co., Ltd**  
(Incorporated in Japan)  
1006 Oaza Kadoma, Kadoma-shi, Osaka-fu, Japan

(72) Inventor(s)

**Yukinari Inoue**  
**Koichi Yamamoto**  
**Akinori Ohira**  
**Kazuhiro Konishi**

(74) Agent and/or Address for Service

**Gill Jennings & Every**  
Broadgate House, 7 Eldon Street, LONDON,  
EC2M 7LH, United Kingdom

(51) INT CL<sup>7</sup>

H04M 1/02 // H04B 1/38

(52) UK CL (Edition R )

H4J JK J36Q

(56) Documents Cited

GB 2297662 A

EP 0944219 A2

US 5661641 A

GB 2291560 A

EP 0802659 A1

US 5646649 A

GB 2275587 A

US 5818924 A

(58) Field of Search

UK CL (Edition R ) H4J JK

INT CL<sup>7</sup> H04B 1/03 1/034 1/08 1/38 , H04M 1/02 1/03 1/23

Online: EPODOC, JAPIO, WPI

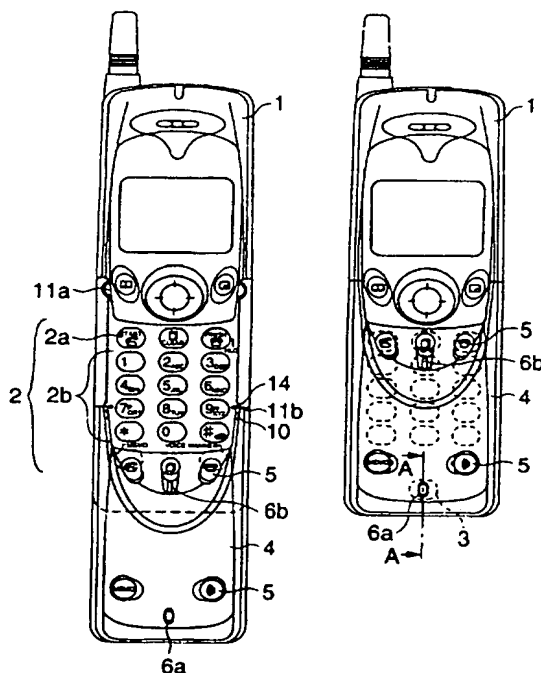
(54) Abstract Title

**Portable radio device with sliding cover**

(57) A portable radio device has on it's sliding cover key pressing means that allow keys on the main body to be operated when the cover is in either of two positions. This allows quick access to incoming calls whilst still protecting from the mis-operation of keys. A second feature shows openings on the cover that line up with the microphone on the main body in the two sliding positions. A third feature shows locking means to hold the cover in the open and closed positions.

FIG.1B

FIG.1A



GB 2 349 292 A

FIG.1C

FIG.1B

FIG.1A

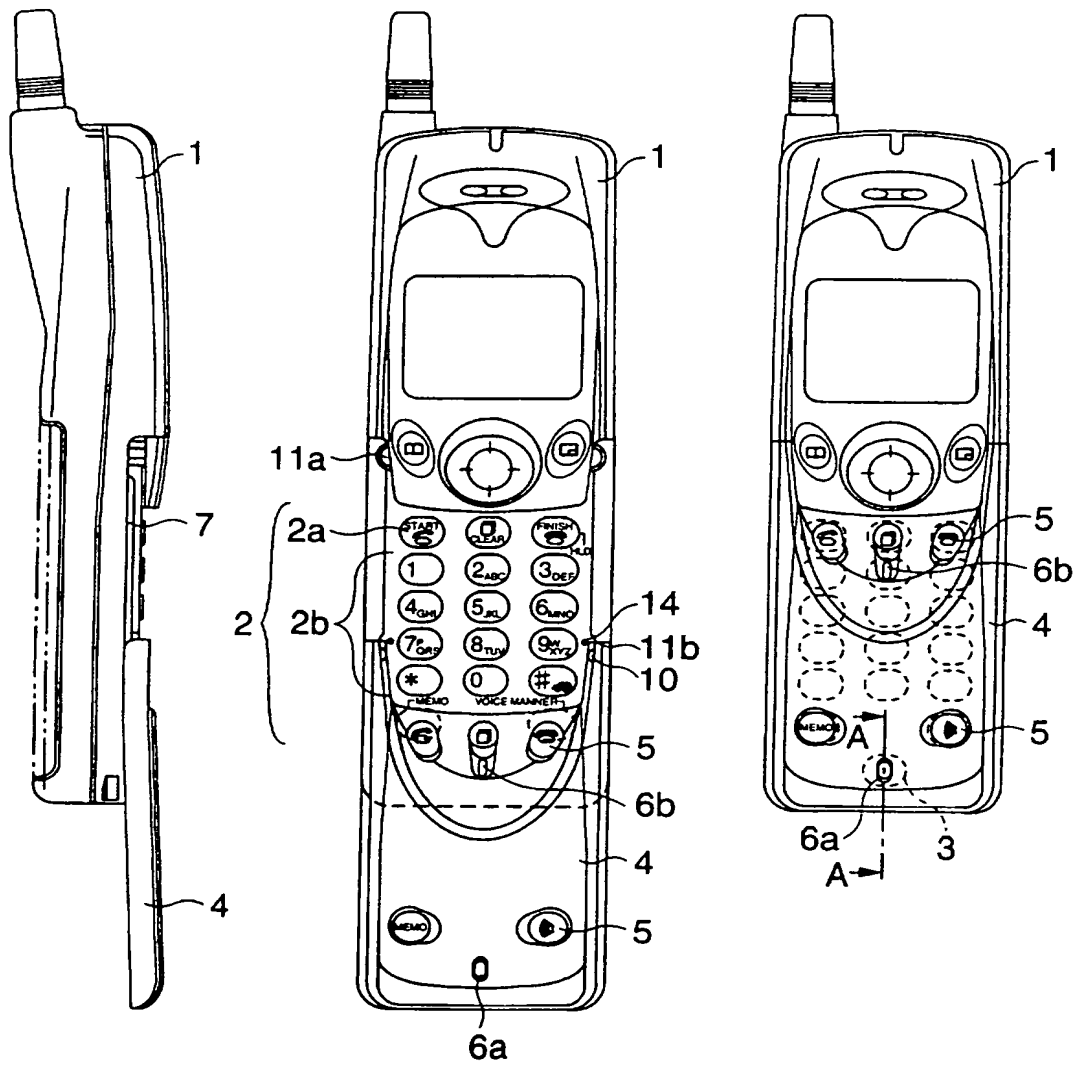


FIG.2A

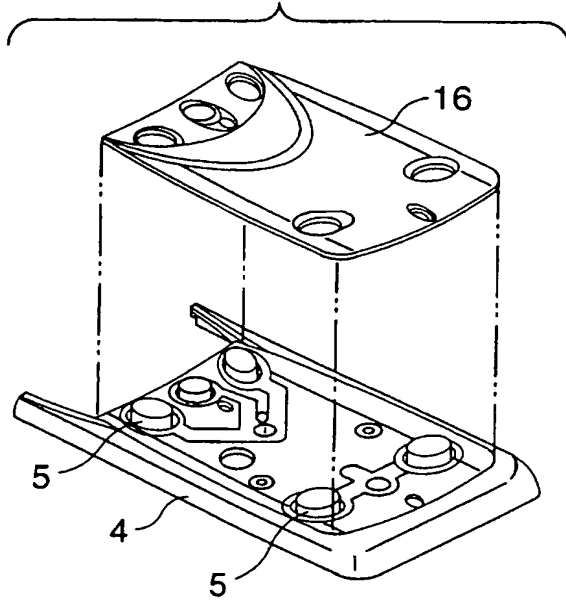


FIG.2B

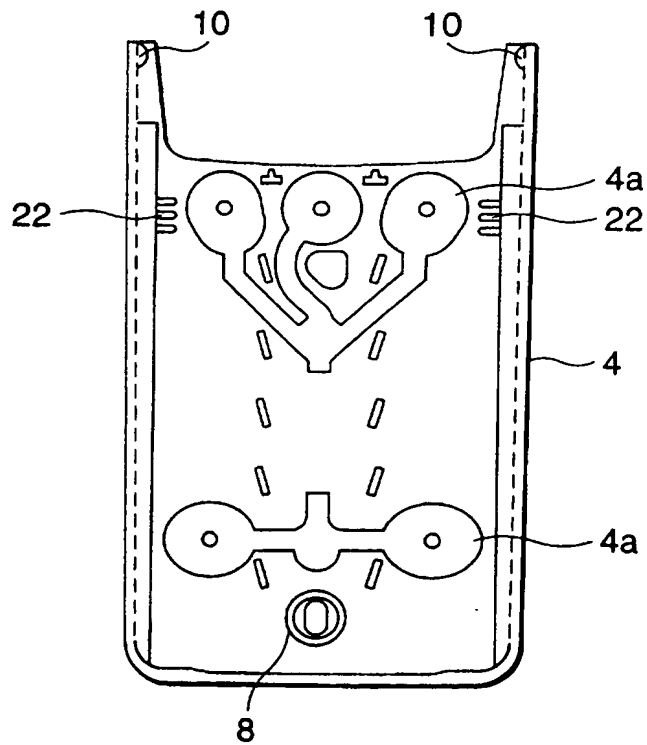


FIG.3A

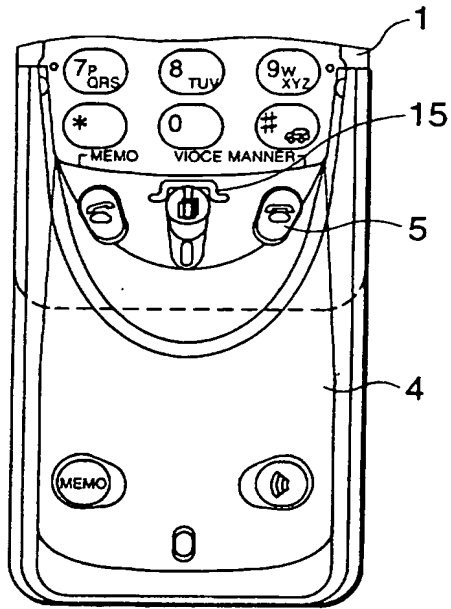


FIG.3B

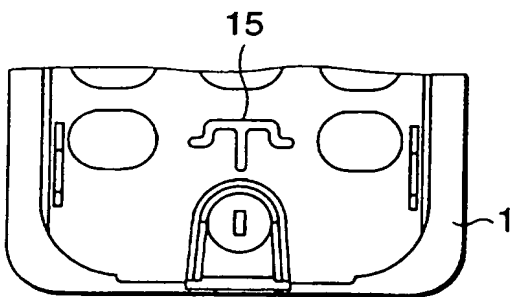


FIG.3C

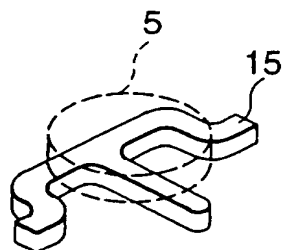


FIG.4A

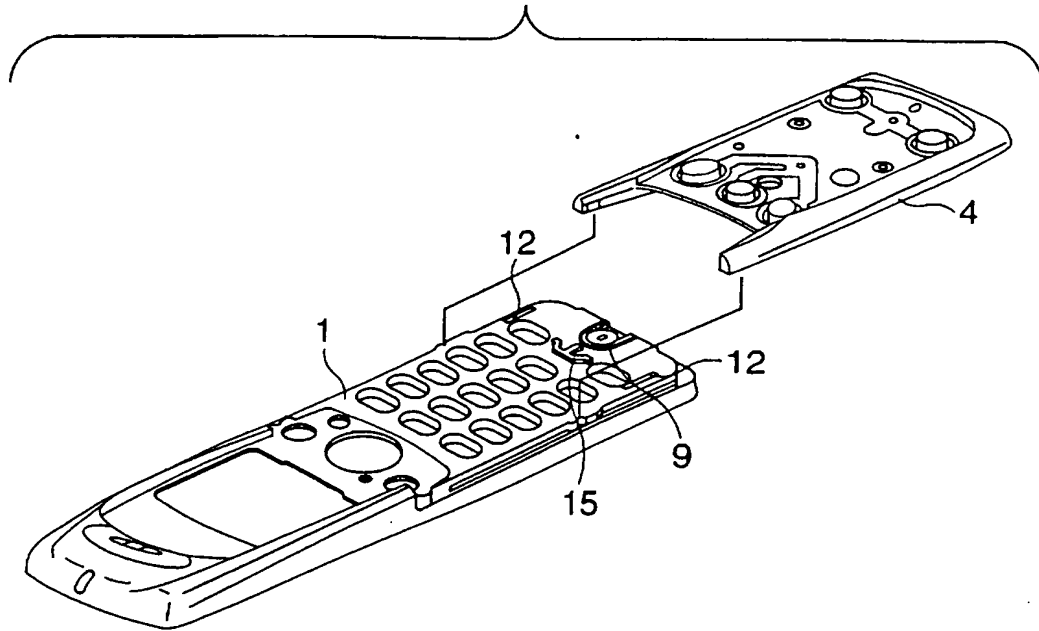


FIG.4B

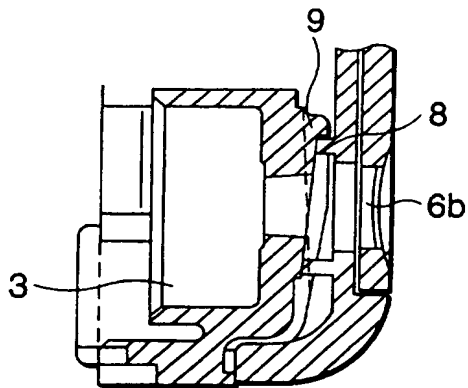


FIG.4C

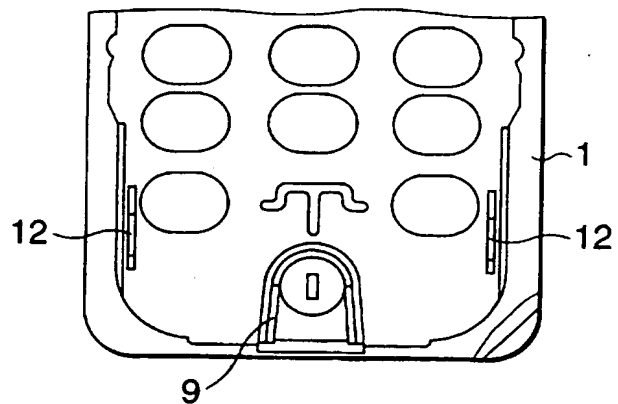


FIG.5A

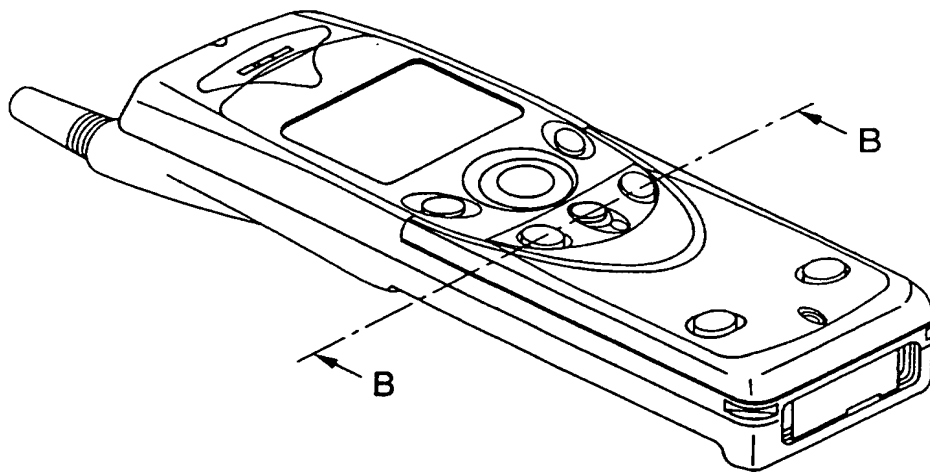


FIG.5B

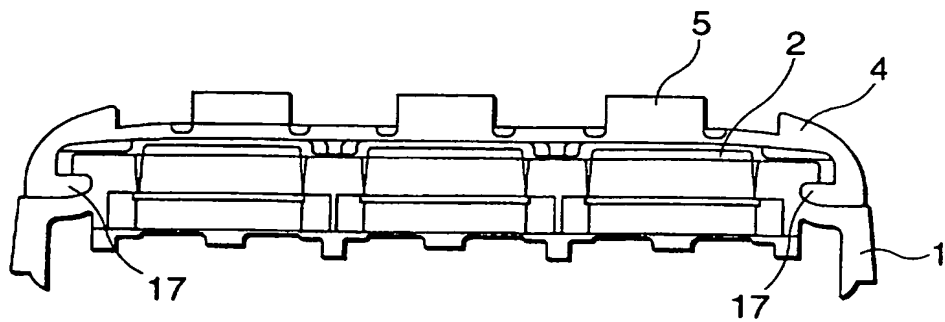
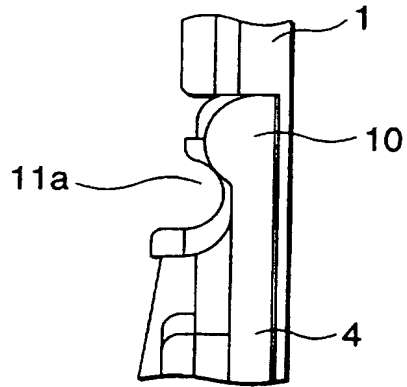
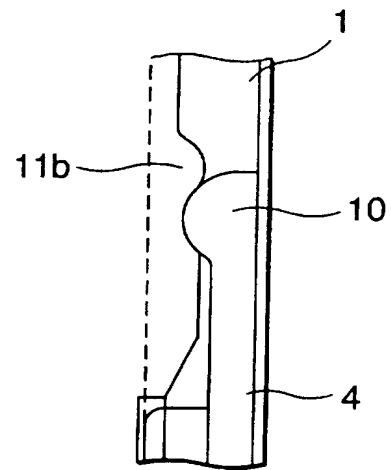


FIG.6A



LOCKING PART (UPPER)  
(IN CARRIAGE WITH THE  
COVER CLOSE)

FIG.6B



LOCKING PART (LOWER)  
(IN TEN KEY OPERATION  
WITH THE COVER OPENED)

FIG.7A

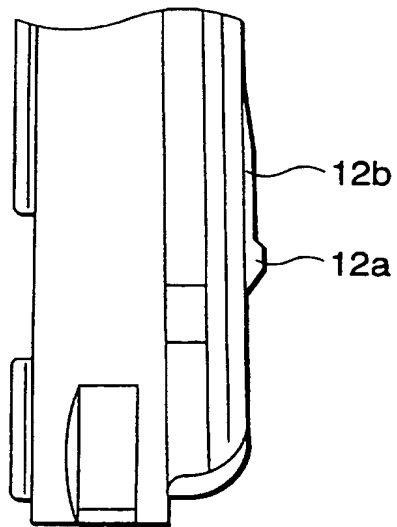


FIG.7B

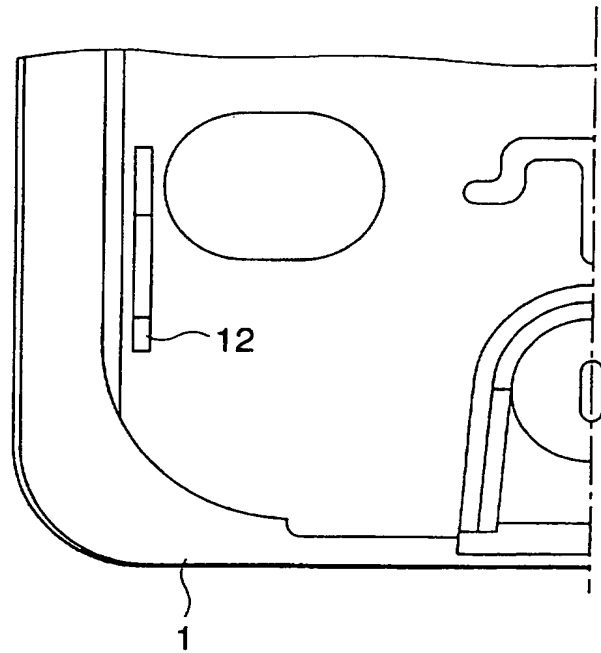




FIG.8A

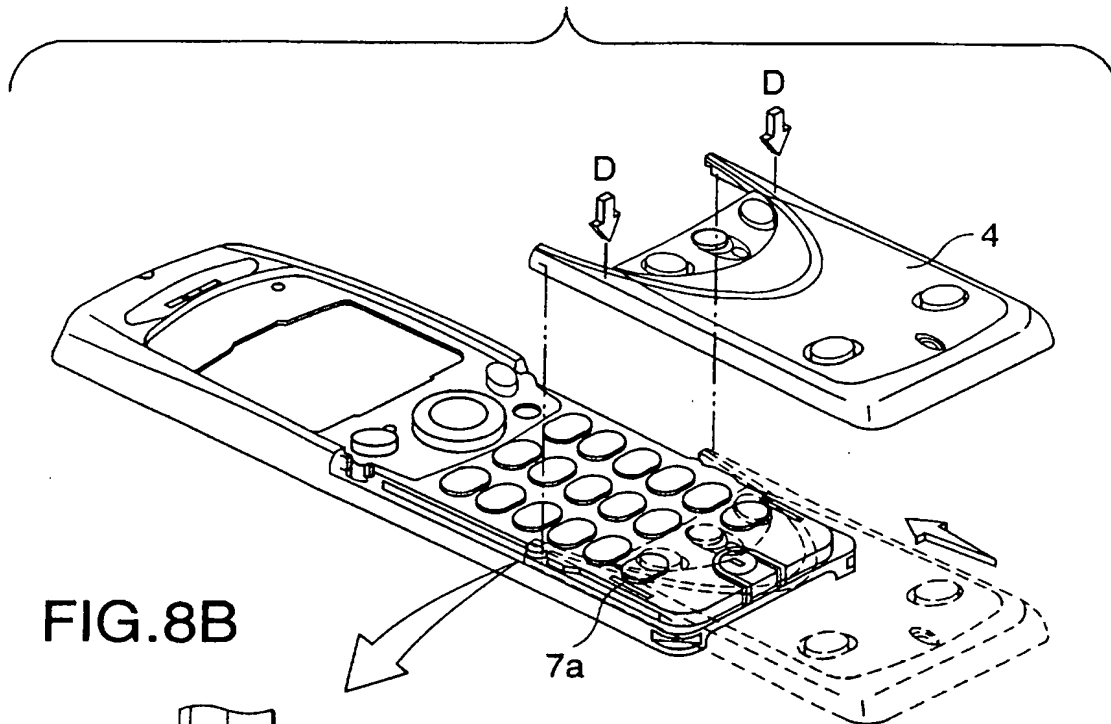


FIG.8B

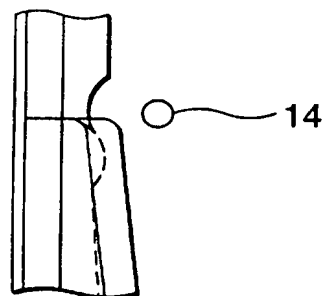


FIG.8C

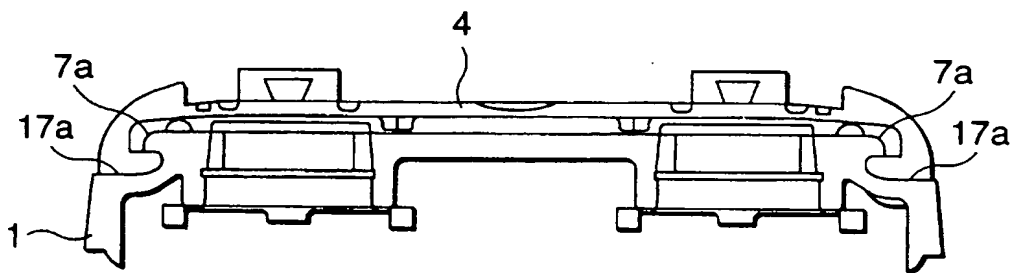
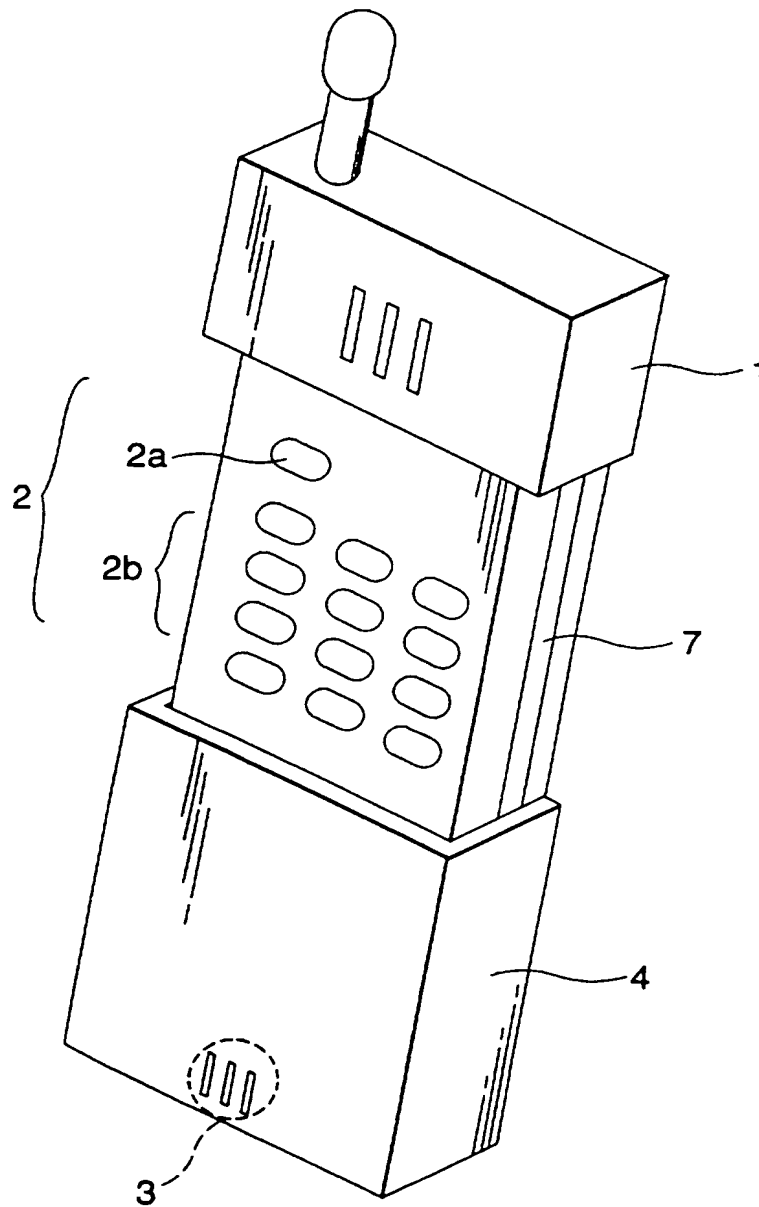


FIG.9



## PORTABLE RADIO DEVICE

The present invention relates to a portable radio device  
5 having a slidable cover, in particular, it relates to that  
allowing the call in the state the cover is closed.

In conventional portable radio devices, a structure for  
covering a key operation part using a foldable structure or a  
rotatable lid has been adopted for providing a small size during  
10 carriage and protection of the key operation part. Furthermore,  
recently, a structure for covering the key operation part by  
a slidable cover has also been put into the practical use.

As shown in FIG. 9, a conventional portable radio device  
having a slidable cover comprises a housing 1 having a key  
15 operation part 2 including a transmission starting key 21 and  
ten keys 2b, and a cover slidable with respect to the housing  
1 according to a rail part 7 so that the cover can be moved in  
the state the key operation part 2 is covered or the state it  
is exposed. Moreover, a transmitter 3 is provided in the cover  
20 4.

The portable radio device can be carried with a small  
size with the key operation part protected by closing the cover  
4. In starting a transmission, by opening the cover 4 for  
exposing the key operation part 2, the key operation can be  
25 enabled so as to provide the transmission state. At the time,

since the transmitter 3 is stored in the cover 4, it can be disposed at the mouth of the user, following the cover 4.

However, according to the conventional configuration, since the key operation part 2 is covered by the cover during carriage, the key operation cannot be enabled immediately. And thus a problem is involved in that the transmission cannot be started without the operation of opening the cover 4 particularly in the case of receiving a call.

Moreover, since the transmitter 3 stored in the cover and the device main body should be energized, a problem arises in that the configuration is complicated and the risk of malfunction and breakage is high.

Furthermore, despite the recent trend toward a smaller size in the portable radio devices, the number of the keys is hardly reduced, and thus the size and the interval of the keys tend to be smaller. As a result, the key operation becomes difficult.

Moreover, recently, in most cases, phone numbers to be called are stored in the memory of a portable radio device so that the number to be called is retrieved from the phone list in the memory for making a call by just pressing the call button, and thus the frequency of using the ten keys for dialing is reduced. However, there are many keys in the key operation part, and as mentioned above, since the size and the interval of the keys are smaller, the risk of making a key operation mistake

is high, and thus the merit of making a transmission just by operating a smaller number of keys has not been fully utilized so far.

In order to solve the conventional problems, an object  
5 of the invention is to provide a portable radio device allowing the key operation or a transmission with the cover on, with little possibility of breakage or malfunction.

Moreover, another object is to provide a portable radio device with an improved operativity by reducing the number of  
10 keys in appearance by covering the ten keys not frequently used so as to reduce the change of operation mistake.

Furthermore, still another object is to provide a portable radio device with a small size without sacrificing the operativity.

15 Accordingly, in a portable radio device according to the invention, a cover for covering a key operation part comprises key pressing parts at a position corresponding to at least one key in the key operation part.

Moreover, a housing comprises a transmitter part, and  
20 the cover for covering the key operation part comprises a transmitting opening at a position corresponding to the transmitting part.

Furthermore, the cover and the housing comprise rails with the cover slidably with respect to the housing in the state  
25 the rails are engaged, and a lock mechanism for fixing the cover

to the housing at least in the state the key operation part is covered by the cover and the state the key operation part is exposed.

Therefore, the keys can be operated with the cover closed  
5 by pressing the key pressing part so as to start a call. By having the key pressing part provided in the cover corresponding only to a limited number of keys, such as the transmission starting key, the number of the keys in appearance can be reduced so that the operativity can be improved.

10 Moreover, the transmission can be conveyed from the transmitting part with the cover closed.

Furthermore, since the cover can be locked with the cover closed, or the cover can be locked in the state the cover is opened by sliding so as to expose the key operation part, the  
15 operativity can be improved.

According to the present invention, a portable radio device comprising: a housing having a key operation part; a cover for covering the key operation part; and at least a key pressing  
20 part formed integrally with the cover, wherein the cover is slidable between first end where the key operation part is covered and second end where a part of the key operation part is exposed, wherein the key pressing part is at a position corresponding at least a key of the key operation part when the  
25 cover is disposed the first end or the second end.

Since a first aspect of the invention is a portable radio device comprising a housing having a key operation part, and a slidable cover for covering the key operation part, wherein the cover comprises key pressing parts formed integrally with the cover at a position corresponding to at least one key in the key operation part in the state the key operation part is covered, the key operation can be executed with the cover closed.

Since the cover comprises key pressing parts formed integrally with the cover at a position corresponding to at least one key in the key operation part in the state the key operation part is exposed in a second aspect of the invention, the cover needs not be opened until all the keys in the key operation part are exposed, and thus a small size of the device can be achieved.

Since the key pressing parts are disposed at a position corresponding to other keys in the state the key operation part is covered by the cover in a third aspect of the invention, different keys can be operated by the same key pressing parts in the state the cover is closed and the cover is opened.

Since the keys in the key operation parts to be operated by the key pressing part include a transmission starting key in a fourth aspect of the invention, a call can be started with the cover closed.

Since the key pressing parts are formed integrally with the cover by a two-color molding method using a resin comprising the cover and an elastomer resin comprising the key pressing

parts in a fifth aspect of the invention, the number of the components can be reduced according to the integration so as to facilitate the assembly, and further, the risk of breakage can be reduced as well.

5           Since the housing comprises a press preventing projecting part at a position of at least one of the key pressing parts not corresponding to a key in the case there are key pressing parts corresponding to a key of the key operation part only in the either state the key operation part is covered by  
10 the cover or the key operation part is exposed in a sixth aspect of the invention, the risk of excessive deformation of the cover due to press of the key pressing parts can be avoided.

          According to the present invention, a portable radio device comprising: a housing having a key operation part; a cover  
15 for covering the key operation part; transmitter part on the housing; and a transmitting opening provided on the cover, wherein the cover is slidable between first end where the key operation part is covered and second end where a part of the key operation part is exposed, wherein the transmitting opening  
20 is a position corresponding the transmitter part when the cover is located at the first end or the second end.

          Since a seventh aspect of the invention is a portable radio device comprising a housing having a key operation part, and a slidable cover for covering the key operation part, wherein  
25 the housing comprises a transmitter part, and the cover comprises



a transmitting opening at a portion corresponding to the transmitting part in the state the key operation part is covered, the transmission can be enabled with the cover closed.

Since an eighth aspect of the invention is the portable  
5 radio device according to any one of the first to sixth aspects, wherein the housing comprises a transmitting part, and the cover comprises a transmitting opening at a portion corresponding to the transmitting part in the state the key operation part is covered, the transmission can be enabled with the cover closed.

10 Since a ninth aspect of the invention is a portable radio device comprising a housing having a key operation part, and a slidable cover for covering the key operation part, wherein the housing comprises a transmitter part, and the cover comprises a transmitting opening at a portion corresponding to the  
15 transmitting part in the state the key operation part is exposed, the transmitter can be protected by the cover even in the case the cover is opened.

Since a tenth aspect of the invention is the portable radio device according to any one of the first to sixth aspects,  
20 wherein the housing comprises a transmitter part, and the cover comprises a transmitting opening at a portion corresponding to the transmitting part in the state the key operation part is exposed, the transmitter can be protected by the cover even in the case the cover is opened.

25 An eleventh aspect of the invention is the portable radio

device according to the seventh or eighth aspect, wherein the cover comprises a second transmitting opening at a portion corresponding to the transmitting part in the state the key operation part is exposed, the cover needs not be opened until  
5 the transmitting part of the housing is exposed, and thus a small size of the device can be achieved.

Since the cover comprises a cylindrical rib surrounding at least one of the transmitting openings at the side facing to the transmitting part in a twelfth aspect of the invention,  
10 the noise leakage of the voice being transmitted can be prevented.

Since the housing comprises a cylindrical rib surrounding the transmitting part in a thirteenth aspect of the invention, the noise leakage of the voice being transmitted can  
15 be prevented.

Since the housing comprises a rib to be fitted with the cylindrical rib provided in the cover, surrounding the transmitting part in a fourteenth aspect of the invention, the noise leakage of the voice being transmitted can be prevented.

20 Since the cover and the housing comprise rails with the cover slidably with respect to the housing in the state the rails are engaged, and a lock mechanism for fixing the cover to the housing at least in the state the key operation part is covered by the cover and the state the key operation part is exposed  
25 in a fifteenth aspect of the invention, the movement of the cover

can be locked in both closed state and opened state, and thus the operativity can be improved.

Since a sixteenth aspect of the invention is a portable radio device comprising a housing having a key operation part, and a slidable cover for covering an optional portion stored in the housing, wherein the cover and the housing comprise rails with the cover slidably with respect to the housing in the state the rails are engaged, and a lock mechanism for fixing the cover to the housing at least in the state the stored portion is covered by the cover and the state the cover is moved from the state to an optional state, the operativity of the cover can be improved not only in covering the key operation part but also in sliding by utilizing the lock mechanism.

Since the lock mechanism comprises nail parts formed in the cover and lock parts formed in the housing to be engaged with the nail parts, with the nail parts disposed at the tip of a bowl-like part elongating from the end of the cover so as to be engaged with the lock parts, utilizing the elasticity of the cover in a seventeenth aspect of the invention, the number of the components can be reduced so as to simplify the configuration.

Since the rail and the lock parts of the lock mechanism are formed integrally in the housing, and the rail and the nail parts of the lock mechanism are formed integrally in the cover in an eighteenth aspect of the invention, the number of the

components can be reduced so as to simplify the configuration as well as to reduce the risk of breakage.

Since projections are provided both in the surface of the housing facing to the cover and in the surface of the cover facing to the housing to be engaged in the state the cover is most spread with respect to the housing for preventing fall-off of the cover from the housing in a nineteenth aspect of the invention, the both projections are contacted with each other so as to serve as a stopper.

Since a projecting shape for forcing up the other projection is added to one of the projections provided in the housing and the cover for preventing backlash of the cover in the state most spread with respect to the housing in a twelfth aspect of the invention, the cover is forced away from the housing in the case the other projection is moved onto the projecting shape so as to eliminate the backlash between the rails.

Since chamfer parts are provided in the range of the rails of the cover and the housing, engaged in the state the cover is most spread with respect to the housing for facilitating attachment or detachment of the cover in a twenty-first aspect of the invention, in the case a force is applied with the detached cover superimposed on a predetermined position of the housing, the rails regain the engaged state so that the cover can be mounted on the housing.

Since the position for locking the slide of the cover

is indicated at least at one point of the housing in a twenty-second aspect of the invention, the sliding distance of the cover can be adjusted or the cover can be mounted based on the indicated position.

5                   Brief Description of the Drawings

FIG. 1A is a plan view of a portable radio device according to a first embodiment of the invention in the state with a cover closed, FIG. 1B is a plan view thereof in the state with the cover opened, and FIG. 1C is a side view thereof in  
10 the state with the cover opened.

FIG. 2A is a perspective view of the cover formed by a two-color molding method of the portable radio device according to the first embodiment, and FIG. 2B is a rear view of the cover.

FIG. 3A is a plan view showing the position of disposing  
15 a press preventing projecting part in the portable radio device according to the first embodiment, FIG. 3B is a plan view showing a housing with the press preventing projecting part disposed, and FIG. 3C is a perspective view showing the press preventing projecting part.

20                   FIG. 4A is a perspective view showing a cylindrical rib provided around a transmitting opening part in the portable radio device according to the first embodiment, FIG. 4B is a cross-sectional view showing the cylindrical rib provided around the transmitting opening part, and FIG. 4C is a plan view  
25 showing the cylindrical rib provided around the transmitting

opening part in the housing.

FIG. 5A is a perspective view of a portable radio device according to a second embodiment, and FIG. 5B is a cross-sectional view showing the rail structure thereof, taken on the  
5 line B-B.

FIG. 6A is a partial enlarged view showing a lock mechanism of the portable radio device according to the second embodiment in the state with the cover closed, and FIG. 6B is a partial enlarged view showing the lock mechanism in the state  
10 with the cover opened.

FIG. 7A is a partial enlarged side view showing a stopper projecting part and a backlash preventing part of the portable radio device according to the second embodiment, and FIG. 7B is a partial enlarged plan view thereof.

FIG. 8A is a perspective view of the portable radio device according to the second embodiment in the state with the cover detached, FIG. 8B is an enlarged view showing a lock position indicating part, and FIG. 8C is a cross-sectional view showing a chamfer part for attachment or detachment.  
15

FIG. 9 is a perspective view showing a conventional portable radio device having a slidable cover.  
20

Hereinafter embodiments of the invention will be explained with reference to the drawings.

25 (First Embodiment)

As shown in FIGS. 1A to 1C, a first embodiment of a portable radio device comprises a cover 4 slidable with respect to a housing. FIG. 1A is a plan view showing the state with the cover 4 closed, FIG. 1B is a plan view showing the state with the cover opened, and FIG. 1C is a side view showing the state with the cover opened.

Moreover, FIG. 2A is an exploded perspective view of the cover 4, and FIG. 2B is a rear view of the cover 4. The cover 4 is provided with key pressing parts 5 formed integrally with the cover. When the key pressing parts 5 are pressed, keys of the housing 1 disposed below the key pressing parts 5 are pressed accordingly. The key pressing parts 5 are made from an elastomer resin, which is different from a resin comprising the cover 4. According to the integral molding by a two-color molding method with the two materials, the cover 4 shown in FIGS. 2A and 2B can be produced. Numeral 4a denotes the portion of the elastomer resin. Since border lines appear on the borders of the different materials in the two-color molding, a decoration panel 16 is fitted to the front side of the cover 4 for hiding the border lines. The decoration panel 16 is provided with holes for exposing the key pressing parts 5.

Furthermore, the cover 4 has two openings for transmission (6a, 6b in FIGS. 1A, 1B), and the decoration panel 16 is provided with holed at the positions corresponding to the openings. Numeral 8 in FIG. 2B denotes a cylindrical rib

surrounding the opening.

Moreover, the cover 4 comprises a rail part to be engaged with a rail part 7 provided in the housing 1 so that the cover can slide from the state of FIG. 1A to the state of FIG. 1B.

5 Furthermore, numeral 10 in FIG. 2B denotes a locking nail for positioning the cover 4 with respect to the housing 1, and numeral 22 denotes a stopper projection part. The sliding mechanism and the positioning mechanism of the cover 4 will be explained in detail in the second embodiment.

10 In contrast, as shown in FIGS. 1A and 1B, the housing 1 is provided with operation keys 2 including a transmission starting key 2a, a clear key, a finish key, ten keys 2b, a memo key, and voice manner key. Further, a transmitter 3 is provided at a lower part of the housing 1.

15 As shown in FIG. 1A, the five pressing parts 5 of the cover 4 are disposed above the transmission starting key 2a, the clear key, the finish key, the memo key, and the voice manner key in the state with the cover 4 closed so that the user can operate these keys by pressing the pressing parts 5 with the  
20 cover 4 closed.

Moreover, the transmitting opening part 6a of the cover 4 is disposed above the transmitter 3 in the state with the cover 4 closed so that the user can transmit a call from the transmitter 3 with the cover 4 closed.

25 Therefore, even in the case the device is carried with



the cover 4 closed, a call can be started by operating the pressing parts 5 of the cover so as to press the transmission starting key 2a without the operation of opening the cover.

Furthermore, as shown in FIG. 1B, the other transmitting opening part 6b of the cover 4 is disposed above the transmitter 3 in the state with the cover 4 opened so that the user can input the voice to the transmitter 3 via the transmitting opening part 6b.

Moreover, two pressing parts 5 out of the five pressing parts 5 of the cover 4 are disposed above the memo key and the voice manner key in the state with the cover 4 opened so that in the case the user operates these keys in the state with the cover 4 opened, he presses the pressing parts 5 disposed thereabove.

Accordingly, when the cover 4 is opened, the pressing parts 5 of the cover 4 are disposed on keys different from those of the case the cover 4 is closed so that a part of the operation keys can be operated from above the cover 4 by pressing the pressing parts 5 even in the state the cover 4 is opened, and thus a small size of the device can be achieved.

In the state with the cover 4 opened (FIG. 1B), no key is disposed below the pressing part 5 between the pressing parts 5 disposed above the memo key and the voice manner key. In the case the pressing part 5 is pressed down in this state, the cover 4 may be deformed excessively so as to be broken. In order to

prevent the trouble, as shown in FIG. 3C, a press preventing projecting part 15 for limiting the press down amount of the pressing part 5 is provided immediately below the pressing part 5 of the housing 1 (FIGS. 3A, 3B). the thickness of the press preventing projecting part 15 is substantially same as the projecting amount of the keys in the key operation part 2.

Since the press preventing projecting part 15 is provided, excessive deformation derived from the press operation of the pressing part 5 not to be used can be prevented so that the risk of breakage can be reduced.

Moreover, as shown in FIG. 4B (a cross-sectional view taken on the line A-A of FIG. 1A), a transmitter 3 is stored inside the housing 1, and a rib 9 is formed around the opening for the transmitter 3 provided in the housing 1, surrounding the half circumference of the opening. In contrast, a cylindrical rib 8 (FIGS. 4B, 2B) is provided around the transmitting opening part 6b of the cover, with the cylindrical rib 8 fitted with the rib 9. Therefore, noise leakage between the transmitting opening part 6b and the transmitter 3 can be prevented so that deterioration of the communication quality can be prevented.

According to the portable radio device, a transmission can be started by operating the pressing parts 5 in the cover 4 with the cover 4 closed. Since the number of the pressing parts 5 is smaller than the number of the keys in the key operation

part 2 so that only the communication operations using a small number of keys, such as transmission to a number retrieved in the phone list in the memory, or starting a talk at the time of receipt, can be enabled according to the operation of the pressing parts 5. In other words, since the other keys unnecessary for these communication operations are covered by the cover 4, generation of an operation mistake can be prevented.

Moreover, since the transmitter 3 is stored in the housing 1 in this device, unlike those having a transmitter in the cover side, a simple configuration can be achieved with a less possibility of malfunction. Furthermore, the noise leakage between the transmitting opening part 6b and the transmitter 3 can be prevented owing to the cylindrical rib 8 and the fitting rib 9 so that deterioration of the communication quality can be prevented.

Moreover, since a part of the pressing parts 5 of the cover 4 are disposed on the keys even in the state the cover 4 is slid open so as to expose the key operation part 2 of the housing 1, the part of the operation keys can be operated from above the cover 4 by operating the pressing parts 5 even in the state with the cover 4 opened, and thus a small size of the device can be achieved.

Furthermore, since the cover 4 and the pressing parts 5 are formed integrally, a small size of the device can be achieved as well as the number of the components can be reduced

so that the cost can be cut back as well as the risk of breakage can be reduced.

Although the case with the cylindrical rib 8 and the rib fitted has been explained here, it is also possible to provide  
5 only the cylindrical rib in either the cover 4 or the housing 1.

Moreover, it is also possible to expose all the keys in the key operation part 2 of the housing 1 in the state with the cover 4 opened.

10 Furthermore, it is also possible to expose the transmitter 3 in the state with the cover 4 opened, with the cover 4 provided with only the transmitting opening part 6a at a position corresponding to the transmitter 3 in the state with the cover 4 closed.

15 (Second Embodiment)

In a second embodiment, the sliding mechanism and the stopper mechanism of the cover in the portable radio device according to the first embodiment will be explained.

FIG. 5B shows a cross-section taken on the line B-B of  
20 a portable radio device of FIG. 5A. A rail part 17, bent inward is provided along the end rim of the cover 4 along the rail part 7 (FIG. 1C) of the housing. With the rail part 17 engaged with the rail part 7 of the housing 1, the cover 4 can slide with respect to the housing 1 with the engaged state maintained.

25 Moreover, in order to position the sliding cover 4 with

respect to the housing 1, locking nails 10 (FIG. 2B) are provided in the cover 4 at the tip of the bowl-like part elongating from the end of the cover, and further, locking parts 11a and 11b (FIG. 1B) to be engaged with the locking nails 10 are provided  
5 integrally in the housing 1. According to the bowl-like shape, elastic force is applied to the locking nails 10 in the inward direction.

The locking nails 10 are engaged with the locking parts 11a in the state the cover 4 covers the key operation part 2  
10 (closed state), and are engaged with the locking parts 11b in the state the cover 4 exposes the key operation part 2 (opened state). FIG. 6A is an enlarged partial plan view of the engaged state of the lock mechanism 11a and the locking nail 10, and FIG. 6B is an enlarged partial plan view of the engaged state  
15 of the lock mechanism 11b and the locking nail 10.

Accordingly, since the locking nails 10 formed integrally with the cover 4 are engaged with the locking parts 11a or 11b provided in the housing 1 side, utilizing the elasticity of the cover, the cover 4 can be positioned in the  
20 closed state or in the opened state.

Furthermore, stopper projections 12, elongating in the longitudinal direction of the housing 1 are provided on both sides in the lower part of the housing 1 (FIGS. 4A, 4C, 7A, 7B). As shown in a side view of FIG. 7A, the projections 12 include  
25 portions 12a with the largest projecting amount and portions

12b with a little projecting amount provided continuously therefrom. The portions 12b with a little projecting amount serve for preventing backlash of the cover 4.

Stopper projections 22 elongating in the shorter side direction of the cover are provided inside the cover 4 (FIG. 2B) so that in the case the cover 4 is slid in the opening direction, the projections 22 are moved onto the backlash preventing parts 12b of the housing 1 so as to eliminate the gap between the rails 7, 17 for eliminating the backlash of the cover 4. Moreover, when the projections 22 contact with the stopper projections 12, the further movement of the cover 4 is inhibited.

Furthermore, in the case a stronger force is applied on the cover 4 in the opened state in the sliding direction, or a strong external force is applied on the cover 4 in the vertical direction, the cover 4 is detached from the housing 1.

In mounting the detached cover 4 on the housing 1 again, as shown in FIG. 8A, the rail 17 of the cover 4 is fitted onto the rail 7 of the housing 1 by applying a force from the arrow D direction.

As shown in FIGS. 8A, 8C, in order to mount the cover 4 on the housing 1 smoothly, chamfer parts 7a, 17a are formed in the range of the rails 7, 17 to be engaged in the state with the cover 4 most spread with respect to the housing 1.

Accordingly, by superimposing the cover 4 on the housing 1 such that the chamfer part 17a of the detached cover 4 is

contacted with the chamfer part 7a of the housing 1, and applying  
a force thereon from the vertical direction with respect to the  
cover surface, the rail 17 of the cover 4 is fitted beneath the  
rail of the housing 7 so that the cover 4 is mounted on the housing  
5 1.

According to the configuration, the cover 4 can be  
attached or detached easily. And further, even in the case an  
excessive force is applied from the outside in the state with  
the cover 4 opened, breakage can be prevented owing to the  
10 detachment of the cover.

Moreover, as shown in FIG. 8B in the enlarged state,  
an indication 14 is provided at a position on the housing whereat  
the cover 4 is to be locked. Since the user can adjust the  
sliding distance of the cover 4 or position the mounting position  
15 of the cover 4 based on the indication 14, the operativity can  
be improved.

The indication 14 can be provided by any means, such  
as forming a projecting part on the housing, forming a recess  
part, applying a character, printing, or the like. Furthermore,  
20 the indication 14 can be provided to each locking position, or  
only at one locking position.

Accordingly, since the movement of the cover 4 is locked  
both in the state with the cover 4 closed for carriage and in  
the state with the cover 4 opened for operating the ten keys  
25 in the portable radio device, the operativity can be improved.

Moreover, since the locking nails 10 are formed integrally with the cover so as to provide the locking mechanism, utilizing the elasticity of the cover, a simple configuration can be provided with a reduced number of the components, and  
5 further, the risk of breakage can be reduced.

Furthermore, since the stopper projections 12 having the backlash preventing parts 12b are provided, even if the cover is opened for the key operation, there is no risk of backlash or fall-off of the cover.

10 Moreover, the operation of attaching or detaching the cover onto the housing can be executed smoothly.

Although the stopper projections having the backlash preventing parts are provided on the housing side here, they can be provided on the cover side with the stopper projections  
15 22 of FIG. 2 provided on the housing side.

As apparent from the explanation above, the portable radio device according to the invention allows the key operation or the communication in the carriage state with the slide cover closed.

20 Furthermore, since the pressing parts or the locking nails of the cover are formed integrally with the cover, a simple configuration can be provided with a small number of the components, and further, the risk of breakage or malfunction is low.

25 Moreover, a portable radio device with a smaller size,



excellent operativity, a wide designing freedom, and little communication quality deterioration can be realized.

### CLAIMS

1        A portable radio device comprising:  
a housing having a key operation part;  
a cover for covering the key operation part; and  
at least a key pressing part formed integrally with the  
cover,

wherein the cover is slidable between first end where  
the key operation part is covered and second end where a part  
of the key operation part is exposed,

wherein the key pressing part is at a position  
corresponding at least a key of the key operation part when the  
cover is disposed the first end or the second end.

2.        The portable radio device according to claim 1,  
wherein the key pressing part is at a position  
corresponding to other key of the key operation part when the  
cover is located at another end.

3.        The portable radio device according to claim 1  
or 2,  
wherein the keys in the key operation parts to be  
operated by the key pressing part include a transmission starting  
key.

4.        The portable radio device according to any one  
of claims 1-3,  
wherein the key pressing parts are formed integrally  
with the cover by a two-color molding method using a resin

comprising the cover and an elastomer resin comprising the key pressing parts.

5. The portable radio device according to any one of claims 1-4,

wherein the cover further comprises a press preventing projecting part at a position of at least one of the key pressing parts not corresponding to a key when there are key pressing parts corresponding to a key of the key operation part only in the either state the cover is located at the first end or second end.

6. A portable radio device comprising:  
a housing having a key operation part;  
a cover for covering the key operation part;  
transmitter part on the housing; and  
a transmitting opening provided on the cover;

wherein the cover is slidable between first end where the key operation part is covered and second end where a part of the key operation part is exposed,

wherein the transmitting opening is a position corresponding the transmitter part when the cover is located at the first end or the second end.

7. The portable radio device according to any one of claims 1-5,

wherein the housing further comprises a transmitter portion,

wherein the cover further comprises a transmitting opening provided on the cover,

wherein the transmitter part is a position corresponding the transmitter part when the cover is located at the first end or second end.

8. The portable radio device according to claim 6 or 7,

wherein the cover further comprises a second transmitting opening at a position corresponding to the transmitter part when the cover is located at another end.

9. The portable radio device according to any one of claims 6-8,

wherein the cover further comprises a cylindrical rib surrounding at least one of the transmitting openings at the side facing to the transmitting part.

10. The portable radio device according to claim 9,

wherein the housing comprises a rib to be fitted with the cylindrical rib provided in the cover, surrounding the transmitting part.

11. The portable radio device according to one of claims 6-8,

wherein the housing comprises a cylindrical rib surrounding the transmitting part.

12. A portable radio device comprising:

a housing having a key operation part;

a slidable cover for covering an optional portion stored in the housing;

the cover and the housing further comprising:

rails with the cover slidably with respect to the housing in the state the rails are engaged; and

a lock mechanism for fixing the cover to the housing at least in the state the stored portion is covered by the cover and the state the cover is moved from the state to an optional state.

13. The portable radio device according to any one of claims 1-11,

wherein the cover and the housing comprise:

rails with the cover slidably with respect to the housing in the state the rails are engaged; and

a lock mechanism for fixing the cover to the housing when the cover is located at the first end and when the cover is located at the second end.

14. The portable radio device according to claim 12 or 13,

wherein the lock mechanism further comprises:

nail parts formed in the cover; and

lock parts formed in the housing to be engaged with the nail parts,

wherein the nail parts disposed at the tip of a bow-like part elongating from the end of the cover so as to be engaged

with the lock parts, utilizing the elasticity of the cover.

15. The portable radio device according to claim 14, wherein the rail and the lock parts of the lock mechanism are formed integrally in the housing, and the rail and the nail parts of the lock mechanism are formed integrally in the cover.

16. The portable radio device according to any one of claims 12-15,

wherein projections are provided both in the surface of the housing facing to the cover and in the surface of the cover facing to the housing to be engaged in the state the cover is most spread with respect to the housing for preventing fall-off of the cover from the housing.

17. The portable radio device according to claim 16, wherein a projecting shape for forcing up the other projection is added to one of the projections provided in the housing and the cover for preventing backlash of the cover in the state most spread with respect to the housing.

18. The portable radio device according to any one of claims 12-17,

wherein chamfer parts are provided in the range of the rails of the cover and the housing, engaged in the state the cover is most spread with respect to the housing for facilitating attachment or detachment of the cover.

19. The portable radio device according to any one of claims 12-18,

wherein the position for locking the slide of the cover is indicated at least at one point of the housing.

20. A portable radio device substantially as described with reference to Figures 1 to 8 of the accompanying drawings.



INVESTOR IN PEOPLE

Application No: GB 0009472.2  
Claims searched: 1 - 5, 7 - 11, 13 - 20

Examiner: Guy Tucker  
Date of search: 6 July 2000

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): H4J (JK)

Int Cl (Ed.7): H04M1/02, 1/03, 1/23; H04B1/03, 1/034, 1/08, 1/38

Other: Online: EPODOC, JAPIO, WPI

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2297662 A (MOTOROLA) see whole document	1 & 3 at least
X	GB 2291560 A (MOTOROLA) see whole document	1 & 3 at least
X	GB 2275587 A (MITSUBISHI) see in particular figs. 5 & 10 and page 13	1, 3 & 7 at least
X	EP 0944219 A2 (NOKIA) see whole document	1, 3 & 13 at least
X	EP 0802659 A1 (LUCENT) see whole document	1 & 3 at least
X	US 5818924 A (KING et al.) see whole document	1 & 3 at least
X	US 5661641 A (SHINDO) see whole document	1 & 3 at least
X	US 5646649 A (IWATA et al.) see whole document	1 & 3 at least

X Document indicating lack of novelty or inventive step  
Y Document indicating lack of inventive step if combined with one or more other documents of same category.

& Member of the same patent family

A Document indicating technological background and/or state of the art.  
P Document published on or after the declared priority date but before the filing date of this invention.

E Patent document published on or after, but with priority date earlier than, the filing date of this application.